

Notice of Allowability

Application No.

10/635,695

Examiner

Robert A. Hopkins

Applicant(s)

STEIN ET AL.

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1724

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to response filed 6-19-06.
2. ☒ The allowed claim(s) is/are 1-28 and 30-34(renumbered 1-33 respectively).
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 8-14-06
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Cancel claims 29 and 35-46.

Election/Restrictions

This application is in condition for allowance except for the presence of claims 29 and 35-46 directed to groups II,III, and IV non-elected without traverse. Accordingly, claims 29 and 35-46 have been cancelled.

Allowable Subject Matter

Claims 1-28 and 30-34 are allowed.

The following is an examiner's statement of reasons for allowance:

Claims 1 and 31 recite "a plurality of planar ion transport membrane modules disposed in the interior of the pressure vessel and arranged in series, each membrane module comprising mixed metal oxide ceramic material and having an interior region and an exterior region, wherein any inlet and any outlet of the pressure vessel are in flow communication with exterior regions of the membrane modules". Prasad et al(5733435) teaches combining an ion transport membrane and a mixed conductor

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membrane in a multiple stage system(column 7 lines 59-67). However, Prasad et al fails to teach a plurality of planar ion transport membrane modules disposed in the interior of the pressure vessel and arranged in series. Balaachandran et al (5536728) teaches a cross flow reactor having an array of reactor cells in parallel downstream of an inlet manifold, the reactor cells including an oxygen permeable material having oxygen ion conductivity(column 7 lines 32-37). However Balaachandran et al fails to teach a plurality of planar ion transport membrane modules disposed in the interior of the pressure vessel and arranged in series, each membrane module comprising mixed metal oxide ceramic material and having an interior region and an exterior region, wherein any inlet and any outlet of the pressure vessel are in flow communication with exterior regions of the membrane modules. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a plurality of planar ion transport membrane modules disposed in the interior of the pressure vessel and arranged in series, each membrane module comprising mixed metal oxide ceramic material and having an interior region and an exterior region, wherein any inlet and any outlet of the pressure vessel are in flow communication with exterior regions of the membrane modules because neither Prasad et al nor Balaachandran et al suggest such a modification. Claims 2-26 depend on claim 1 and hence are also allowed. Claims 32-34 depend on claim 31 and hence are also allowed.

Claim 27 recites "a plurality of planar ion transport membrane modules disposed in the interior of the pressure vessel and arranged in a series of banks of modules". Prasad et al(5733435) teaches combining an ion transport membrane and a mixed

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conductor membrane in a multiple stage system(column 7 lines 59-67). However, Prasad et al fails to teach a plurality of planar ion transport membrane modules disposed in the interior of the pressure vessel and arranged in a series of banks of modules. Balaachandran et al (5536728) teaches a cross flow reactor having an array of reactor cells in parallel downstream of an inlet manifold, the reactor cells including an oxygen permeable material having oxygen ion conductivity(column 7 lines 32-37). However Balaachandran et al fails to teach a plurality of planar ion transport membrane modules disposed in the interior of the pressure vessel and arranged in a series of banks of modules. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a plurality of planar ion transport membrane modules disposed in the interior of the pressure vessel and arranged in a series of banks of modules.

Claim 28 recites "a plurality of ion transport membrane modules disposed in the interior of the pressure vessel and arranged in series, each membrane module comprising mixed metal oxide ceramic material and having an interior region and an exterior region, wherein any inlet and any outlet of the pressure vessel are in flow communication with exterior regions of the membrane modules". Prasad et al(5733435) teaches combining an ion transport membrane and a mixed conductor membrane in a multiple stage system(column 7 lines 59-67). However, Prasad et al fails to teach a plurality of ion transport membrane modules disposed in the interior of the pressure vessel and arranged in series. Balaachandran et al (5536728) teaches a cross flow reactor having an array of reactor cells in parallel downstream of an inlet

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manifold, the reactor cells including an oxygen permeable material having oxygen ion conductivity(column 7 lines 32-37). However Balaachandran et al fails to teach a plurality of ion transport membrane modules disposed in the interior of the pressure vessel and arranged in series, each membrane module comprising mixed metal oxide ceramic material and having an interior region and an exterior region, wherein any inlet and any outlet of the pressure vessel are in flow communication with exterior regions of the membrane modules. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a plurality of ion transport membrane modules disposed in the interior of the pressure vessel and arranged in series, each membrane module comprising mixed metal oxide ceramic material and having an interior region and an exterior region, wherein any inlet and any outlet of the pressure vessel are in flow communication with exterior regions of the membrane modules because neither Prasad et al nor Balaachandran et al suggest such a modification. Claim 30 depends on claim 28 and hence is also allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

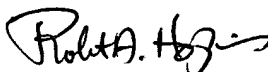
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert A. Hopkins whose telephone number is 571-272-1159. The examiner can normally be reached on Monday-Thursday, 7:30am-5pm, every Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RAH
September 25, 2006


ROBERT A. HOPKINS
PRIMARY EXAMINER
